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EXAMINER	
PHAN, HANH	
ART UNIT	**PAPER NUMBER**
2633	12

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No.	Applicant(s)
	09/724,256	DESALVO ET AL.
	Examiner	Art Unit
	Hanh Phan	2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 28 November 2000 .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-31 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) 21-24 and 26-30 is/are allowed.

6)☒ Claim(s) 1-4, 6-14,16-20, 25 and 31 is/are rejected.

7)☒ Claim(s) 5 and 15 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 & 11 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 25 and 31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- Claim 25 recites the limitation "said PIN detector" in line 4. There is insufficient antecedent basis for this limitation in the claim.

- Claim 31 recites the limitation "said PIN detector" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-4, 6, 9-14, 16, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatakeyama (US Patent No. 5,517,351) in view of Williams et al (US Patent No. 6,384,948).

Regarding claim 1, referring to figures 1 and 2, Hatakeyama discloses an optically amplified receiver (i.e., an optically amplified receiver as indicated in Fig. 1) comprising:

an optical preamplifier (i.e., an erbium-doped optical fiber 2, Fig. 1) for receiving an optical communications signal (i.e., input signal light 21, Fig. 1) over a fiber optic communications line (col. 3, lines 24-40);

a bandpass filter (i.e., optical bandpass filter 4, Fig. 1) operatively connected to said optical preamplifier (i.e., an erbium-doped optical fiber 2) for receiving the optical communications signal (col. 3, lines 35-40);

a photodetector (i.e., a receiving photodetector 6, Fig. 1) for receiving the optical communications signal from said bandpass filter (4) and converting the optical communications signal into an electrical communications signal (col. 3, lines 35-38); and

an amplifier circuit (i.e., a pre-amplifier 8 and a post-amplifier 9, Fig. 1) for amplifying the electrical communications signal (col. 3. lines 39-41).

Hatakeyama differs from claim 1 in that he fails to teach the bandpass filter selects a single channel and filtering out noise produced by the optical preamplifier and the photodetector is a PIN detector. However, Williams in US 6,384,948 teaches an optically amplifier receiver (Fig. 4) comprises a bandpass filter (60)(Figs. 4 and 6A) selects a single channel and filtering out noise produced by the optical preamplifier (i.e., low noise EDFA preamplifier 52A, Figs. 4 and 6A)(see col. 7, lines 5-21). Williams further teaches a receiving photodetector is PIN detector (Fig. 2) for receiving the

optical signal and converting to an electrical signal (col. 2, lines 13-25). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the bandpass filter and PIN detector as taught by Williams in the system of Hatakeyama. One of ordinary skill in the art would have been motivated to do this since Hatakeyama suggests in column 7, lines 12-20 and column 2, lines 30-34 that using such optical bandpass filter and PIN detector have advantage of allowing selecting the wanted signal and eliminating the unwanted signals and the noise signals to increase the signal to noise ratio and the sensitivity of the photoreceiver.

Regarding claims 2 and 12, referring to figures 1 and 2, Hatakeyama discloses an optically amplified receiver (i.e., an optically amplified receiver as indicated in Fig. 1) comprising:

an optical preamplifier (i.e., an erbium-doped optical fiber 2, Fig. 1) for receiving an optical communications signal (i.e., input signal light 21, Fig. 1) over a fiber optic communications line (col. 3, lines 24-40);

a bandpass filter (i.e., optical bandpass filter 4, Fig. 1) operatively connected to said optical preamplifier (i.e., an erbium-doped optical fiber 2) for receiving the optical communications signal (col. 3, lines 35-40);

a photodetector (i.e., a receiving photodetector 6, Fig. 1) for receiving the optical communications signal from said bandpass filter (4) and converting the optical communications signal into an electrical communications signal (col. 3, lines 35-38); and

an amplifier circuit (i.e., a pre-amplifier 8 and a post-amplifier 9, Fig. 1) for amplifying the electrical communications signal (col. 3. lines 39-41).

Williams discloses an optically amplifier receiver (Fig. 4) comprises a bandpass filter (60)(Figs. 4 and 6A) selects a single channel and filtering out noise produced by the optical preamplifier (i.e., low noise EDFA preamplifier 52A, Figs. 4 and 6A)(see col. 7, lines 5-21) and the bandpass filter (60) is a tunable bandpass filter (col. 8, lines 44-49). Williams further teaches a receiving photodetector is PIN detector (Fig. 2) for receiving the optical signal and converting to an electrical signal (col. 2, lines 13-25) (as applied to claim 1).

Williams further teaches the bandpass filter (60) is a tunable bandpass filter (col. 8, lines 44-49).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the bandpass filter is a tunable bandpass filter as taught by Williams in the system of Hatakeyama. One of ordinary skill in the art would have been motivated to do this since Williams suggests in column 7, lines 12-20 and column 2, lines 30-34 that using such optical bandpass filter which is a tunable bandpass filter has advantage of allowing selecting a single channel and eliminating the unwanted signals and the noise signals and to increase the signal to noise ratio.

Regarding claims 3 and 13, the combination of Hatakeyama and Williams differs from claims 3 and 13 in that it does not specifically teach the PIN diode is operative at about 3.3 volts. However, it is well known in the art that there is inherent a high power supply voltage or a low power supply voltage providing for a photodiode (PIN

photodiode or APD photodiode) to bias. Whether to use a high power supply voltage or a low power supply voltage providing for a PIN photodiode to bias would have been within the knowledge of a person having ordinary skill in the art and would have been an obvious engineering design choice. Moreover, providing a low power supply voltage for a photodiode have advantage of allowing increasing the sensitivity of the photodiode and reduce the power consumption. Therefore, it would have been obvious to obtain the PIN diode is operative at about 3.3 volts in order to provide a photodetector having a high speed of response to light and lower power.

Regarding claims 4 and 14, Hatakeyama further teaches a laser (i.e., a pumping semiconductor laser 7, Fig. 1) for pumping the optical preamplifier (i.e., an erbium-doped optical fiber 2, Fig. 1) and a laser driver (i.e., a driving circuit for pumping semiconductor laser 16, Fig. 1) interfaced with the laser used for pumping the optical preamplifier (col. 3, lines 24-57).

Regarding claims 6 and 16, Hatakeyama further teaches the optical preamplifier (i.e., an erbium-doped optical fiber 2, Fig. 1) is connected to a single wavelength optical communications line (a single optical communication line connected to an erbium-doped optical fiber 2 through an optical isolator 1 wherein the optical signal light 21 is received and amplified by the erbium-doped optical fiber 2, see Fig. 1).

Regarding claims 9 and 19, referring to figures 1 and 2, Hatakeyama discloses an optically amplified receiver (i.e., an optically amplified receiver as indicated in Fig. 1) comprising:

an optical preamplifier (i.e., an erbium-doped optical fiber 2, Fig. 1) for receiving an optical communications signal (i.e., input signal light 21, Fig. 1) over a fiber optic communications line (col. 3, lines 24-40);

a bandpass filter (i.e., optical bandpass filter 4, Fig. 1) operatively connected to said optical preamplifier (i.e., an erbium-doped optical fiber 2) for receiving the optical communications signal (col. 3, lines 35-40);

a photodetector (i.e., a receiving photodetector 6, Fig. 1) for receiving the optical communications signal from said bandpass filter (4) and converting the optical communications signal into an electrical communications signal (col. 3, lines 35-38); and

an amplifier circuit (i.e., a pre-amplifier 8 and a post-amplifier 9, Fig. 1) for amplifying the electrical communications signal (col. 3. lines 39-41).

Williams discloses an optically amplifier receiver (Fig. 4) comprises a bandpass filter (60)(Figs. 4 and 6A) selects a single channel and filtering out noise produced by the optical preamplifier (i.e., low noise EDFA preamplifier 52A, Figs. 4 and 6A)(see col. 7, lines 5-21) and the bandpass filter (60) is a tunable bandpass filter (col. 8, lines 44-49). Williams further teaches a receiving photodetector is PIN detector (Fig. 2) for receiving the optical signal and converting to an electrical signal (col. 2, lines 13-25) (as applied to claim 1).

Williams further teaches an amplifier circuit (Fig. 2) comprises an electronic limiting amplifier for reshaping the electrical communication signal (col. 2, lines 39-65).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the amplifier circuit comprises an electronic limiting amplifier as taught by Williams in the system of Hatakeyama. One of ordinary skill in the art would have been motivated to do this since Williams suggests in column 2, lines 39-65 that using such amplifier circuit comprises an electronic limiting amplifier has advantage of allowing amplifying the signal and adjusting the gain to a fixed level.

Regarding claims 10 and 20, Hatakeyama further teaches the amplifier circuit comprises a decision circuit (discriminator 10, Fig. 1) and clock recovery circuit (i.e., timing extracting circuit 11, Fig. 1) for retiming the electrical communication signal (col. 3, lines 46-51).

Regarding claim 11, referring to figures 1 and 2, Hatakeyama discloses an optically amplified receiver (i.e., an optically amplified receiver as indicated in Fig. 1) comprising:

an optical preamplifier (i.e., an erbium-doped optical fiber 2, Fig. 1) for receiving an optical communications signal (i.e., input signal light 21, Fig. 1) over a fiber optic communications line (col. 3, lines 24-40);

a bandpass filter (i.e., optical bandpass filter 4, Fig. 1) operatively connected to said optical preamplifier (i.e., an erbium-doped optical fiber 2) for receiving the optical communications signal (col. 3, lines 35-40);

a photodetector (i.e., a receiving photodetector 6, Fig. 1) for receiving the optical

communications signal from said bandpass filter (4) and converting the optical communications signal into an electrical communications signal (col. 3, lines 35-38); and

an amplifier circuit (i.e., a pre-amplifier 8 and a post-amplifier 9, Fig. 1) for amplifying the electrical communications signal (col. 3. lines 39-41).

Williams discloses an optically amplifier receiver (Fig. 4) comprises a bandpass filter (60)(Figs. 4 and 6A) selects a single channel and filtering out noise produced by the optical preamplifier (i.e., low noise EDFA preamplifier 52A, Figs. 4 and 6A)(see col. 7, lines 5-21) and the bandpass filter (60) is a tunable bandpass filter (col. 8, lines 44-49). Williams further teaches a receiving photodetector is PIN detector (Fig. 2) for receiving the optical signal and converting to an electrical signal (col. 2, lines 13-25) (similarly as applied to claim 1).

Hatakeyama as modified by Williams above discloses all the aspects of the claimed invention except fails to teach one of either a housing or printer card assembly containing the optical preamplifier, PIN detector and amplifier circuit as an integrated receiver assembly. However, a method integrating all the components of an electronic circuit or an optical circuit formed on a single chip of semiconductor mounted on a single piece of substrate material is very well known in the art . This method has advantage of allowing reduce size, weight, space, power consumption and cost of the whole system. Therefore, it would have been obvious to obtain a printer card assembly containing the optical preamplifier, PIN detector and amplifier circuit as an integrated receiver assembly in order to reduce size, weight, space, power consumption and cost

of the whole system.

5. Claims 7, 8, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatakeyama (US Patent No. 5,517,351) in view of Williams et al (US Patent No. 6,384,948) and further in view of Vanoli et al (US Patent No. 5,943,147).

Regarding claims 7 and 17, Hatakeyama as modified by Williams above discloses all the limitations of the claimed invention as set forth in the rejection to claims 1, 6 and claims 11, 12 and 16 above, except fails to teach the optical communications signal that is received over the optical communications line comprises a wavelength division multiplexed optical communications signal. However, Vanoli teaches a wavelength division multiplexing system (Fig. 1) wherein the optical communications signal that is received over the optical communications line comprises a wavelength division multiplexed optical communications signal (col. 7, lines 45-56 and 65-67, and col. 8, lines 1-40). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the optical communications signal that is received over the optical communications line comprises a wavelength division multiplexed optical communications signal as taught by Vanoli in the system of Hatakeyama modified by Williams. One of ordinary skill in the art would have been motivated to do this since Vanoli suggests in column 1, lines 24-44 that using such optical communications signal that is received over the optical communications line comprises a wavelength division multiplexed optical communications signal have

advantage of allowing providing an optical communication system having a high capacity transmission and high speed.

Regarding claims 8 and 18, Hatakeyama as modified by Williams above discloses all the limitations of the claimed invention as set forth in the rejection to claims 1, 6, and 11, 12 and 16 above.

Vanoli teaches a wavelength division multiplexing system (Fig. 1) wherein the optical communications signal that is received over the optical communications line comprises a wavelength division multiplexed optical communications signal (col. 7, lines 45-56 and 65-67, and col. 8, lines 1-40)(as applied to claim 7).

Vanoli further teaches a demultiplexer (10)(Fig. 1) operatively connected to the preamplifier (9)(Fig. 1) and band pass filter (11a-11d)(Fig. 1) for demultiplexing the wavelength division multiplexed optical communications signal (col. 8, lines 25-40).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the demultiplexer operatively connected to the preamplifier and band pass filter for demultiplexing the wavelength division multiplexed optical communications signal as taught by Vanoli in the system of Hatakeyama modified by Williams. One of ordinary skill in the art would have been motivated to do this since Vanoli suggests in column 1, lines 24-44 and col. 8, lines 26-40 that using such demultiplexer operatively connected to the preamplifier and band pass filter has advantage of allowing separating the wavelength multiplexed signal into the wavelength individual signals providing for the respective users.

Allowable Subject Matter

6. Claims 5 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claims 25 and 31 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph set forth in this Office Action.

8. Claims 21-24 and 26-30 are allowed.

9. The following is a statement of reasons for the indication of allowable subject matter:

-With respect to claims 5, 15 and 21-26, the prior art fails to teach and render obvious an optically amplified receiver comprising: a low noise, gain flattened, erbium doped optical preamplifier for receiving an optical communications signal over an optical communications line; a bandpass filter operatively connected to said optical preamplifier for receiving the optical communications signal, selecting a single channel, and filtering out noise produced by the optical preamplifier; a laser driver operatively connected to said optical preamplifier and bandpass filter for driving said preamplifier and comprising, an injection laser diode; a current source control loop circuit connected to said injection laser diode that establishes a fixed current through the injection laser diode; and a voltage switcher circuit connected to said injection diode and current source control loop

circuit, said voltage switcher circuit adapted to receive a fixed supply voltage and convert inductively the supply voltage down to a forward voltage to bias the laser diode and produce an optical output into the preamplifier having minimized power losses; and an optical-to-electrical conversion circuit operatively connected to said preamplifier for converting the optical communications signal into an electrical communication signal.

-With respect to claims 27-31, the prior art fails to teach and render obvious an optically amplified receiver comprising: a low noise, gain flattened erbium doped optical preamplifier for receiving a wave division multiplexed optical signal over a single optical communications line; a bandpass filter operatively connected to said optical preamplifier for receiving the optical signal, selecting a channel, and filtering out noise produced by the optical preamplifier; a laser driver operatively connected to said optical preamplifier and bandpass filter and comprising, an injection laser diode; a current source control loop circuit connected to said injection laser diode that establishes a fixed current through the injection laser diode; and a voltage switcher circuit connected to said injection diode and current source control loop circuit, said voltage switcher circuit adapted to receive a fixed supply voltage and convert inductively the supply voltage down to a forward voltage to bias the laser diode and produce an optical output into the preamplifier having minimized power losses; a demultiplexer circuit operatively connected to said low noise, gain flattened erbium doped optical preamplifier for demulitiplexing the wave division multiplexed optical signal into demultiplexed optical signals; a plurality of receiver channels for receiving the demultiplexed optical signals;

and an optical-to-electrical conversion circuit positioned within each receiver channel for converting the optical signals into electrical communication signals.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Grandpierre (US Patent No. 5,854,704) discloses receiver for optical digital transmission system.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hanh Phan whose telephone number is (703)306-5840.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached on (703)305-4729. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-4700.

Hanh Phan

Hanh Phan

08/08/2003